

CLAIMS

1. Molecularly imprinted microspheres comprising specific binding sites, obtainable by polymerising
5 functional monomers and crosslinkers in a reaction solvent in the presence of print molecules as templates in a surfactant-free precipitation polymerisation process, which print molecules are capable of forming non-covalent or reversible covalent interactions with
10 said functional monomers.
2. Molecularly imprinted microspheres according to claim 1, the diameter of which are within the range of 0.01 to 10 μ m.
3. Molecularly imprinted microspheres according to
15 claim 1, which are monodisperse.
4. A method of producing molecularly imprinted microspheres comprising specific binding sites, c h a r a c t e r i s e d by polymerising functional
20 monomers and crosslinkers in a reaction solvent in the presence of print molecules as templates in a surfactant-free precipitation polymerisation process, which print molecules are capable of forming non-covalent or reversible covalent interactions with said functional
monomers.
- 25 5. A method according to claim 4, wherein the total volume of polymerisable monomers and crosslinkers is kept in the range of about 0.01 to 20 % of the volume of the reaction solvent.
- 30 6. A method according to claim 4 or 5, wherein the reaction solvent is aqueous or non-aqueous.
7. A method according to claim 4 or 5, wherein said reaction solvent is composed of a single solvent component or of multiple solvent components.
- 35 8. A method according to claim 4, wherein said functional monomers have the same functionality.
9. A method according to claim 4, wherein said functional monomers have different functionality.

10. A method according to claim 4 or 5, wherein the solubility of the print molecules in the reaction solvent is adjusted by changing the composition of the reaction solvent.

5 11. A method according to claim 4, wherein the polymerisation is induced by heat, UV radiation, γ radiation and/or chemically.

10 12. A method according to claim 4, wherein said polymerisation process is a free-radical polymerisation process, an ionic polymerisation process, a coordination polymerisation process or a step growth polymerisation process.

13. A method according to claim 4 or 5, wherein a desired size of the microspheres is achieved by
15 controlling the nucleation and particle growth process.

14. A method according to claim 13, wherein the control of the nucleation and particle growth process is achieved by adjusting the composition of the functional monomer/crosslinker/solvent system and/or the reaction
20 conditions during the polymerisation in order to change the solubility of the growing polymer chains.

15. A method according to claim 13, wherein the control of the nucleation and particle growth process is such as to avoid aggregation of the microspheres.

25 16. A method according to claim 4 or 5, wherein the size of the microspheres as produced is in the range of 0.01-10 μ m.

17. A method according to claim 4 or 5, wherein the reaction conditions are controlled so that the
30 microspheres become monodisperse.

18. Use of the molecularly imprinted microspheres as defined in any one of claims 1-3, or prepared according to any one of claims 4-17, for screening of chemical libraries, for catalysis, for facilitating synthesis, for
35 analyte determination using ligand binding assays and/or agglutination assays, for therapeutic purposes, or for controlled release.

19. Use of the molecularly imprinted microspheres as defined in any one of claims 1-3, or prepared according to any one of claims 4-17, as stationary phase or modifier in capillary electrophoresis, capillary electrochromatography or HPLC analysis.

20. Use of the molecularly imprinted microspheres as defined in any one of claims 1-3, or prepared according to any one of claims 4-17, as recognition component in biomimetic sensors.

21. Use of the molecularly imprinted microspheres as defined in any one of claims 1-3, or prepared according to any one of claims 4-17, as affinity-labelled probe for targeting cells or other biological material.

22. Use of the molecularly imprinted microspheres as defined in any one of claims 1-3, or prepared according to any one of claims 4-17, as binding entities for the preparation of composite materials.